

What is claimed is:

1. An inkjet recording head comprising:

a chamber plate formed with a plurality of pressure chambers filled with ink, the pressure chambers being aligned in a row that extends in a first direction;

a diaphragm adhered to the chamber plate;

a housing having a first surface and a second surface opposing the first surface, the first surface being adhered to the diaphragm, the first surface being formed with a plurality of first grooves that extend in a second direction perpendicular to the first direction, the first grooves confronting the pressure chambers with the diaphragm interposed between the first grooves and the pressure chambers, the second surface being formed with a second groove that extends in the first direction, the first grooves intersecting the second groove at positions that confront the pressure chambers, wherein a plurality of through holes that extend from the first surface through to the second surface of the housing are formed where the first grooves intersect the second groove; and

a plurality of actuators housed in the through holes, one end of each actuator being adhered to the diaphragm.

2. The inkjet recording head as claimed in claim 1, wherein the first grooves are filled with resin except at positions of the through holes, and the resin has a surface

that shares the same plane with the first surface of the housing.

3. The inkjet recording head as claimed in claim 1,  
wherein the first grooves of the housing are formed using a  
5 dicer.

4. The inkjet recording head as claimed in claim 1,  
wherein the first grooves of the housing are formed using a  
wire saw.

5. An inkjet recording device comprising a head unit  
10 including a plurality of inkjet recording heads as claimed  
in claim 1, the plurality of inkjet recording heads being  
aligned in a row.

6. A method of forming a housing used in an inkjet  
recording head formed with a plurality of pressure chambers  
15 that are aligned in a lengthwise direction, the method  
comprising the steps of:

- a) forming a first groove in a first surface of a  
plate, the first groove extending in the lengthwise  
direction; and
- 20 b) forming a plurality of second grooves in a second  
surface of the plate that is opposite from the first surface,  
the second grooves each extending in a widthwise direction  
that is perpendicular to the lengthwise direction and  
intersecting with the first groove at positions that  
25 correspond to the pressure chambers, the second grooves

being formed to connect with the first groove where the second grooves intersect the first groove to form a plurality of through holes at positions that correspond to the pressure chambers.

5           7. The method as claimed in claim 6, further comprising the steps of:

          c) filling the second grooves with resin except at positions of the through holes; and

10           f) grinding the second surface to form a flat surface from the first surface and the resin.

          8. A method of forming a housing used in an inkjet recording head formed with a plurality of pressure chambers that are aligned in a lengthwise direction, the method comprising the steps of:

15           a) forming a groove into a first surface of a plate, the first groove extending in the lengthwise direction and forming a thin region in the plate; and

          b) punching a plurality of through holes through the thin region, the through holes being formed at a  
20           predetermined pitch.

          9. The method as claimed in claim 8, wherein the step of punching b) includes the steps of:

          c) disposing a metal die within the first groove, the metal die being formed with a plurality of holes that are  
25           aligned at the predetermined pitch; and

d) punching the through holes using a punch from a second surface of the plate that is opposite from the first surface.

10. An inkjet recording head comprising:

5 a chamber plate formed with a plurality of pressure chambers filled with ink, the pressure chambers being aligned in a row that extends in a lengthwise direction;

a diaphragm adhered to the chamber plate;

a housing having a first surface adhered to the  
10 diaphragm, the housing being formed with a plurality of through holes at positions corresponding to the pressure chambers with the diaphragm interposed between the through holes and the pressure chambers; and

a plurality of actuators disposed in the through holes,  
15 one end of each actuator being adhered to the diaphragm, wherein

the housing is produced in the method of claim 8.

11. An inkjet recording head comprising:

a chamber plate formed with a plurality of pressure  
20 chambers aligned in a row;

a set of piezoelectric elements fixed to the chamber plate at positions that correspond to the pressure chambers in the chamber plate;

a housing that supports the chamber plate; and

25 a support member including a comb-shaped section

divided into a plurality of teeth, the comb-shaped section being adhered to the chamber plate with the teeth interposed between adjacent ones of the piezoelectric elements.

12. The inkjet recording head as claimed in claim 11,  
5 wherein the housing has a greater rigidity than the chamber plate, the support member having a rigidity at least as great as rigidity of the chamber plate, the support member further including a support section that supports the comb-shaped section, the support section being fixed to the  
10 housing.

13. The inkjet recording head as claimed in claim 11, wherein the support member is fixed to the housing and extends in a direction in which the teeth are aligned to a length that is shorter than a length of the housing.

14. The inkjet recording head as claimed in claim 11,  
15 wherein a surface of the support member that confronts the chamber plate and a surface of the housing that confronts the chamber plate form a connection surface having a flatness of 15 microns or less.

15. The inkjet recording head as claimed in claim 11,  
20 wherein the housing is formed with a first positioning portion, and the support member is formed with a second positioning portion, and the support member is fixed to the housing as positioned by the first positioning portion, and  
25 the chamber plate is stacked on the support member as

positioned by the second positioning portion.

16. The inkjet recording head as claimed in claim 11,  
wherein the set of piezoelectric elements includes a group  
of active piezoelectric elements and dummy piezoelectric  
5 elements disposed on both sides of the group of active  
piezoelectric elements, one end of each of the dummy  
piezoelectric elements being fixed to the support member.

17. The inkjet recording head as claimed in claim 16,  
wherein each dummy piezoelectric element has a width that is  
10 larger than a width of each active piezoelectric element.

18. The inkjet recording head as claimed in claim 11,  
further comprising a fixing member to which one end of each  
of the dummy piezoelectric elements is fixed, the fixing  
member including arm portions that extend toward the chamber  
15 plate, the arm portions each having a free end with a tip  
fixed to the support member.

19. The inkjet recording head as claimed in claim 11,  
wherein the support member has a substantially U shape in  
cross section.

20. The inkjet recording head as claimed in claim 11,  
wherein the support member has a substantially L shape in  
cross section.

21. The inkjet recording head as claimed in claim 11,  
wherein the support member includes a pair of L-shaped  
25 members each having a substantially L shape in cross section,

the pair of L-shaped members being disposed in confrontation with each other.

22. The inkjet recording head as claimed in claim 21, wherein the plurality of pressure chambers are juxtaposed at  
5 a predetermined pitch, the pair of L-shaped members being shifted from each other by  $1/2$  the pitch of the plurality of pressure chambers.

23. A recording device comprising the inkjet recording head as claimed in claim 11.

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